Claims

1.A sensor element comprising;

a sensor substrate; and

a sensing portion supported by the sensor substrate;

wherein a resin film is provided between the sensor substrate and the sensing portion.

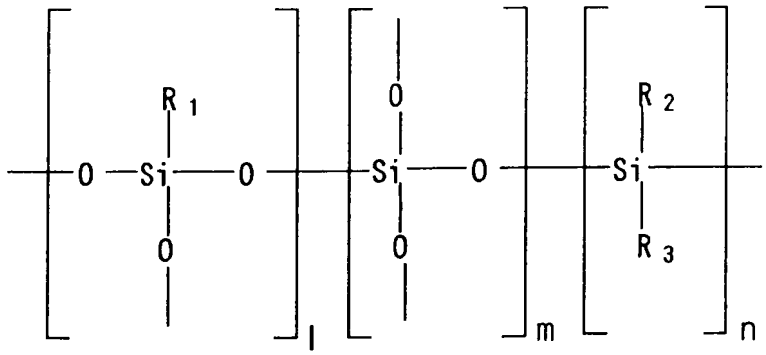
2. The sensor element according to claim 1, wherein the sensing portion has a microfine wiring pattern.

3. The sensor element according to claim 2, wherein the microfine wiring pattern comprises plural wiring patterns being adjacent each other.

4. The sensor element according to claim 1, wherein the resin film is a cured film of a curing polymer selected from a silicone polymer, a polyimide polymer, a polyimide silicone polymer, a polyarylene ether polymer, a bisbenzocyclobutene polymer, a polyquinoline, a perfluorohydrocarbon, a fluorocarbon polymer and an aromatic hydrocarbon polymer.

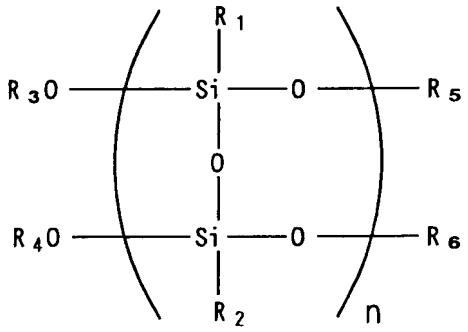
5. The sensor element according to claim 4, wherein the curing polymer is a photo-curing polymer.

6. The sensor element according to claim 1, wherein the resin film is a cured film of the silicone polymer represented by the general formula (1);



wherein R_1, R_2 and R_3, which may be the same or different, each is an aryl group, hydrogen atom, an aliphatic alkyl group, hydroxyl group, a trialkylsilyl group or a functional group having an unsaturated bond; and l, m and n are integers and at least 0; has a weight-average molecular weight of not less than 1,000.

7. The sensor element according to claim 1, wherein the resin film is a cured film of the silicone polymer represented by the general formula (2);



wherein R_1 and R_2, which may be same or different, each is an aryl group, hydrogen atom, an aliphatic alkyl group or a functional group having an unsaturated bond; R_3, R_4, R_5 and R_6, which may be same or different, each is hydrogen atom, an aryl group, an aliphatic alkyl group, a trialkylsilyl group or a

functional group having an unsaturated bond; and n is an integer; and has a weight-average molecular weight of not less than 1,000.

8. The sensor element according to claim 4, wherein the resin film comprises layered film comprising plural layers and each of the layers comprises cured film of different curing polymer.

9. The sensor element according to claim 8, wherein each of the layered film comprises a cured film of curing polymer having different molecular weight.

10. The sensor element according to claim 9, wherein the layered film is composed of a cured film comprising a silicone polymer having a weight-average molecular weight of not less than 100,000 and a cured film comprising a silicone polymer having a weight-average molecular weight of not more than 100,000.

11. The sensor element according to claim 8, wherein the uppermost layer of the layered film comprising plural layers comprises a cured film of a photo-curing polymer.

12. The sensor element according to claim 1, wherein the sensor element is selected from a magnetoresistance sensor, an air flow sensor, an acceleration sensor, a pressure sensor, a yaw rate sensor or an image sensor.

13. A method of fabricating a sensor element, comprising a step of coating a solution of a thermosetting polymer on a

sensor substrate to form a curing polymer film, a step of heating the curing polymer film at temperatures which are not lower than a fusing temperature and are lower than a curing temperature of the thermosetting polymer, a step of heating thereof at the temperature of not lower than the curing temperature to form a cured resin film and a step of forming a desired sensing portion on the cured resin film.

14. The method of fabricating a sensor element according to claim 13, wherein the thermosetting polymer is selected from a silicone polymer, a polyimide polymer, a polyimide silicone polymer, a polyarylene ether polymer, a bisbenzocyclobutene polymer, a polyquinoline polymer, a perfluorohydrocarbon polymer, a fluorocarbon polymer or an aromatic hydrocarbon polymer.